Aviation Human Factors Industry News

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Fatigue Causes Stabilizer Failure

Bell 206B JetRanger- Destroyed- Two fatalities.

About 45 minutes after departing for a pipeline-inspection flight between Cumbernauld, Scotland and Aberdeen on Dec. 21, 2005 the helicopter entered an uncontrolled descent to the ground, killing the pilot and observer.

"The investigation found the vertical stabilizer had detached from the tail boom and struck the tail rotor," said the AAIB report. "This subsequently caused the tail rotor and associated gearbox to become detached form the tail boom."

The report said that the fatigue fractures of the forward and aft vertical stabilizer supports likely hand resulted from insufficient torque applied to the four bolts that attached the supports to a mounting platform on the tail rotor gearbox. The vertical stabilizer had been removed temporarily to facilitate repair of fuselage corrosion during the summer of 2005.

Visual inspections of the support are required every 100 hours. A 100-hour inspection of the accident helicopter had been scheduled after the pipeline-inspection flight. If the supports had not failed during the flight, the inspection likely would have revealed that they were extensively cracked, the report said.

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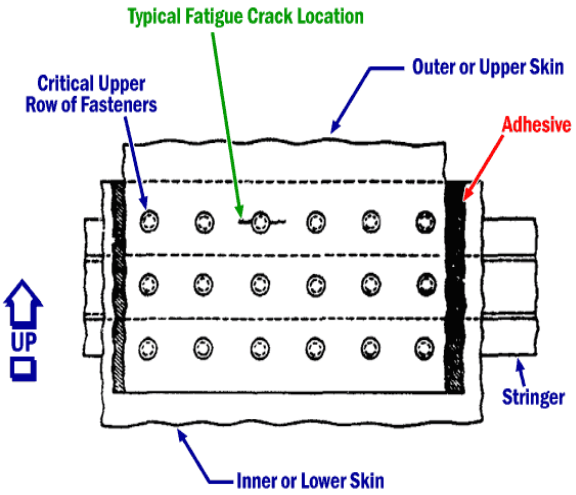
New scrutiny for tired aircraft metal

FAA rule would base lifespan of planes on fatigue



PHILADELPHIA — Every 30 seconds, the curved aircraft panel bulges slightly, its aluminum skin rising and falling like the sigh of some giant metal beast.
The movement is almost imperceptible. But after many thousands of repetitions, these subtle stresses cause tiny cracks — eventually ripping open this piece of an old Boeing 727 like a giant zipper.
The goal of the destruction — a test on the ground by Drexel University and the Federal Aviation Administration — is to make sure this never happens when you're in the air.
Never again, that is. In 1988, an 18-foot section of an Aloha Airlines aircraft tore apart in midair, sucking a flight attendant out of the plane and injuring dozens of terrified passengers. The culprit: a phenomenon known as fatigue.
The accident has spawned years of research, including the Drexel-FAA program, and a new proposal that is causing some turbulence in the industry.
In April, for the first time, the FAA proposed limiting how long commercial airplanes could fly.
Most old planes are being phased out anyway; their inefficient engines aren't viable with today's high fuel prices, industry analyst Robert W. Mann Jr. said. And airlines can get extensions as long as tests show a model is safe to fly.
But the rule, which the FAA can enact after reviewing comments due in September, would be a significant change for an industry that has long insisted its planes are safe to fly "indefinitely," so long as they are well-maintained.

Stressed metal doesn't heal

Ali Bahrami, manager of the FAA's transport airplane directorate, called the rule the "last piece" of many steps the agency has taken since the Aloha accident. "Once it's implemented, it will take us toward a proactive approach of dealing with aging issues," he said.

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But if the regulators have taken their final steps, scientists say they have much to learn. Metal fatigue means what it sounds like. Repeated low levels of stress weaken a piece of metal. But unlike people, metal does not recover with rest.

Fatigued metal is deformed microscopically, in ways not fully understood.
Tiny cracks develop, and eventually the material can no longer carry its weight.
You can demonstrate this with the humble paper clip. Flex it back and forth a few times, and eventually it snaps. Similarly, an airplane flexes in various ways during flight, though the impact takes much longer to see. One type of stress — believed to have led to the Aloha accident — is due to air pressure.
On the ground, pressure inside and outside the cabin is the same. But high in the sky, the pressure inside an airliner is typically about 8 pounds per square inch greater than the outside pressure.

The aluminum skin of the plane stretches slightly as a result, said Drexel's Tein-Min Tan, an associate professor of mechanical engineering.
The circular cross-section of a typical midsize airliner expands an inch or so in flight, he said. The circumference returns to its original size upon landing.
Catastrophic 'unzipping effect'

Engineers have known about fatigue since the mid-1800s, after studying broken train axles and other early casualties of the Industrial Revolution.
They learned more in the 1950s when crashes due to metal fatigue temporarily grounded Britain's Comet airliners, whose sharp-cornered windows led to cracking. Yet the Aloha accident, in a Boeing 737 flying from Hilo, Hawaii, to Honolulu, was a surprise. Investigators blamed the airline for poor maintenance, but engineers also discovered that they didn't know as much about fatigue as they had thought.

No one knew that a series of small fatigue cracks, each insignificant by itself, could be a problem, said John Bakuckas, an FAA research manager.
"When you have so many of them lined up, you have that unzipping effect," he said. "Once they link up, they go very fast," Drexel's Tan said.

The FAA proposal would place different limits on each model of airplane, depending on data from the manufacturer.
It would affect commercial planes that weigh 75,000 pounds or more when loaded. About 1,600 smaller regional jets would be excluded.
If planes were retired at the end of their current "service goals," the rule would phase out 602 airplanes over 20 years — 15 percent of cargo planes and 10 percent of passenger craft. But the rule would allow operators to apply for extensions, so long as tests demonstrated the crafts were safe.

Alloys, treatments in works

Most airlines have not yet commented on the proposal, and have asked for more time to review it. The National Transportation Safety Board supports the measure, but urged the FAA to extend it to smaller planes.
Meanwhile, planes have been improved since Aloha.
Designers now use titanium or advanced alloys of aluminum in parts of a plane where corrosion can be a problem, said Rao Varanasi, manager of Boeing's aging-aircraft program.
Anti-corrosive compounds are sprayed on. And planes are built for "damage tolerance": Assume cracks can develop, but make sure inspections are frequent enough so repairs can be made in time.

Long Hospital Shifts Increase Fatigue-Related Mistakes

According to a new study out of Harvard Medical School, medical residents' long shifts, which can last 24-hours or more, are putting them at high risk of making medical mistakes that can harm or even kill patients. While recently medical residency accreditation councils have limited work schedules to no more than 80 hours in a week, the rules still allow marathon shifts that last up to 30 hours. Researchers found that when residents reported working five marathon shifts in a single month, their risk of making a fatigue-related mistake that harmed a patient increased by 700%. And the risk of making an error that resulted in a patient's death shot up by 300%. (Kathleen Fackelmann, "Study: Long hospital shifts, sleep deprivation can kill" USA Today, December 11, 2006)

Putting a medical resident, or any worker for that matter, in a position where they run a high risk of making a fatigue-related mistake is unacceptable. But unfortunately, we still harbor a cultural mentality of mind over matter, where a human can will themselves to not feel the effects of fatigue and operate at 100 percent. However, over the past 25 years, extensive research on fatigue has confirmed that this mentality is wrong. Fatigue can in fact strike even the strongest person making their cognitive functions diminish and making them have a microsleep without warning. That is why any 24-hour or extended hour operation must design work schedules that are compatible with human physiology. Such schedules have been proven to not only improve the health and safety of the workforce, but also increase production.

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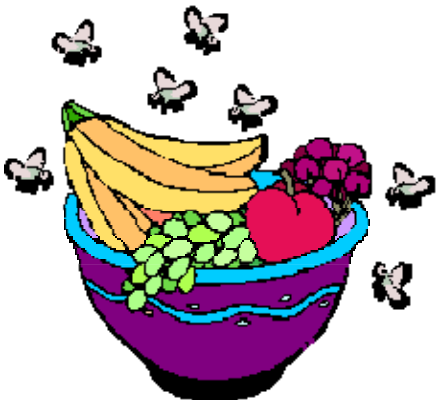
The Toll of Sleep Deprivation in the Military

Studies commissioned by the Dept. of Defense and the Defense Advanced Research Projects Agency found that lack of sleep degrades not only the ability of combat soldiers to identify and locate the enemy, but also-and even more disturbingly- their capacity to care whether they succeed or not.

Think how this bears on the escalation incidents of friendly fire. In World War II, for instance, 21 percent of U.S. casualties were the result of actions by Allied forces. In Vietnam, the figure rose to 39 percent. In the Gulf War, 45 percent of American casualties were attributed to friendly fire. And in the first week of the war in Iraq, the number rocketed to a staggering 66 percent. As retired Special Forces Major F. Andy Messing Jr., executive director of the National Defense Council Foundation, put it at the time, "The biggest killer is fatigue, and right now we have a whole army running toward Baghdad on zippo hours of sleep."

Need a Nap? Spit Here



***Science*NOW Daily News**
11 December 2006

Those living in fear of being operated on by a drowsy doctor or run over by an exhausted truck driver may be in for some good news: Researchers have found a protein in flies and human saliva that seems to signal how sleepy an individual is. If scientists can develop an accurate test for this beddy-bye biomarker, managers may be better able to keep worn-out workers off the job.

Scientists have identified a number of genes that control sleep cycles--and even how deeply we sleep (*Science*NOW, 12 October 2005)--yet there is still no simple biological way to quantify how sleepy someone is. The first tantalizing clue came last year when neurobiologist Paul Shaw and his team at Washington University in St. Louis, Missouri, found that when fruit flies get sleepy, they make more amylase--an enzyme found in human saliva that breaks down starches.

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The protein did not appear to control sleep, says Shaw, but he wondered if it could serve as "a readout of being sleepy."

The next step was to measure amylase levels in flies kept awake through chemical stimulants, such as caffeine. Flies take short naps during the day, and researchers can judge how tired the insects are by observing how much extra naptime they need. After a several hours spent wired with caffeine, flies deprived of sleep for 9 to 12 hours increased their nap length 2 to 7 fold. In addition, their amylase levels were five times those seen in flies not given caffeine. In another experiment, the team marked the amylase with a bioluminescent protein. Flies kept awake using caffeine glowed brighter than those allowed to sleep on their own schedule, the team reports online this week in *Proceedings of the National Academy of Sciences*.

The findings appear to hold true in people as well. When the team deprived nine volunteers of sleep for 28 hours, all showed either higher levels of amylase protein or amylase messenger RNA (an indicator of gene activity) in their saliva than they did after a normal night's sleep.

Although more study in humans is needed, "such a finding could eventually lead to a practical assay for sleepiness to identify people at risk for sleepiness-related mishaps," says James Walsh, a psychologist at Saint Louis University in Missouri and a past president of the National Sleep Foundation in Washington, D.C. David Dinges, a psychologist at the University of Pennsylvania in Philadelphia, agrees. "This is a fundamentally important first step towards developing biomarkers for sleepiness," he says. "I'm very encouraged by this work."

Workplace fatigue risky business at 30,000 ft.

Pilots and attendants face sleep-debt issue

The aviation industry is marked by many shortages - pilots, mechanics, engineers and air traffic controllers. And sleep.

For decades, fatigue among those who fly, guide and maintain planes has been implicated in crashes that have claimed thousands of lives (and many more that have simply been blamed on "pilot error.") It's anybody's guess how many so-called near-misses are due to errors caused by fatigue, or the true cost of the problem both in monetary and human terms.

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Around the world, governments, regulating agencies, airlines and unions are beginning to seriously research fatigue and to implement programs to minimize its effect.

Other workers should pay attention, because the forces that have left the aviation sector in a deep-sleep debt are at work elsewhere, and the solutions in this industry can provide a template for managing a problem that has plagued working humans since the discovery of fire extended the workday beyond sunset.

And the problem is likely to get much worse as these workplace issues persist: Shortages of trained personnel, the push for improved employee productivity in light of economic problems and aging of the workforce.

"There is no doubt fatigue issues are growing," says Capt. Brian Boucher, chair of the technical and safety division of the Air Canada Pilots Association, which represents 3,100 pilots.

"One of the ways to mitigate (the shortage of pilots) is to make the pilots you have fly more."

And that has happened, he says, with the pilot's normal work month of 72 to 80 flying hours now stretched to 80 to 100 hours.

Another is to stretch out a pilot's work life - keeping them in the cockpit past the time when they would normally retire. Boucher's been flying for 34 years, 29 of them with Air Canada, and has plenty of personal experience with fatigue - enough to know that older pilots need more time to recover.

Work weeks have also been stretched for mechanics, flight attendants and air traffic controllers. Overtime regularly eats into rest time.

Research has shown working irregular hours and long shifts, doing monotonous work and exposure to vibration all increase fatigue. So do dimly lit, comfortable environments with high temperatures, lots of noise and tasks needing sustained attention - all hallmarks of an aviation career.

Fatigue is worsened when lack of sleep is coupled with a disruption to the body's circadian rhythm, which regulates high and low energy periods throughout the day - common among flight and ground crews as well as controllers.

And it's also magnified by jetlag. One U.S. sleep researcher estimates 96 per cent of airline pilots and flight attendants operate in a permanent state of jetlag.

The connection between fatigue and loss in performance is clear. As alertness suffers, vital functions slow down - judgment, decisions, memory, reaction time and mood.

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Acute fatigue is caused by a recent sleep loss or intense mental or physical activity over a short period of time. It is easily remedied by a good quality sleep.

But working conditions frequently prevent that, so pilots and attendants accumulate a sleep debt, which can translate into chronic fatigue.

The greatest workload for pilots and attendants comes at the end of a flight, during runway approach and landing. It's the most likely time an accident will occur - but the crew is also at its most tired and is least able to concentrate.

There's little doubt that fatigue also contributes to rates of injury and illness.

One U.S. researcher found in the early '90s that a group of pilots and flight attendants had nearly twice the number of lost workdays, illness and injury as private-sector workers. And their injuries were twice as bad (sprains, strains and broken bones are the most common).

Slowed reaction time isn't helpful when a suitcase comes crashing down on your head, a serving cart mashes into your leg, or turbulence throws you around the cabin or turns pots, pans, dishes and trays into airborne projectiles.

And it certainly gets in the way of quick and accurate decisions needed to avert a crash when equipment fails - or a crew member has made an earlier error in judgment.

As well, the fatigue coupled with flight environments increases risk of contracting infectious disease. Low humidity in flight dries out the mucous membranes, the body's first line of defence against viruses and germs. Recirculated air increases chances of breathing in a pathogen.

Jetlag raises stress hormone levels, increases blood pressure, causes irregular heartbeat and swollen limbs, and magnifies depression.

Lack of breaks and missed meals only worsen the situation.

With an estimated 1.5 billion people traveling by air each year and billions of dollars of goods transported, fatigue in the air industry is a public health and safety issue.

Australia is a world leader in fatigue risk management in transportation industries. Australia's Civil Aviation Safety Authority has said regulatory agencies have to get beyond considering fatigue as a function only of the amount of time spent working.

Other factors that need to be considered are type and intensity of work, time of day (particularly the times when circadian rhythms are telling the body to sleep), the physiological need for sleep and recovery times from fatigue.

Transport Canada is launching a pilot project this fall for aviation maintenance workers to test a proposed fatigue risk-management program, and Capt. Boucher reports progress in implementing a similar program for pilots, but "not for at least a year."

For pilots, says Boucher, that might mean looking at work schedules over longer periods of time - 30 days, 60 days, even 90 days - to ensure adequate recovery time after arduous flights.

In a way, aviation workers are lucky. Their fatigue problems are a public safety issue. Public money is spent on studies to try to find out what causes the problem and how to solve it. Legislators and regulators become involved.

Nobody believes anymore that it's merely part of "working conditions" negotiations between airlines and their employees or their unions.

Neither should it be for workers in other industries who routinely run up a sleep debt.

The root causes and solutions to fatigue-related issues in the aviation industry could provide a template that can be used to prevent or ameliorate the problem in other sectors.

Once fatigue risk-management programs are demonstrated to help the airline industry, perhaps their benefits will be extended to miners, police officers, firefighters, assembly-line workers and anyone else in Canada who has to work long hours, at repetitive tasks or lots of overtime.

When that happens, we can all sleep easier.

Korea-bound Vietnam Airlines jet forced into emergency landing

Vietnam Airlines Deputy Director Nguyen Thanh Trung, said a Vietnam Airlines Airbus A330-300 destined for South Korea was forced to execute emergency landing procedures shortly after take-off Saturday, with authorities citing a glitch in the depressurization system.

All 270 passengers aboard the VN 936 flight, which took off from Hanoi and was in the air for only 15 minutes, were transferred to another plane and the aircraft repaired.

Deputy Director of the airlines Nguyen Thanh Trung said the cause was due to failures in the depressurization system.

The carrier leased the plane just last year, but it had been in service for nearly two decades, Trung said.

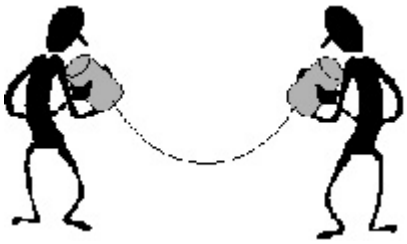
It had to make an emergency landing in November during a domestic flight due to an engine problem.

Also on the same day, another Vietnam Airlines plane from Dien Bien to Hanoi was suspended before take-off because of engine glitches.

Within half a month now, the airline has suffered two emergency landings.

Earlier Lai Xuan Thanh, deputy director of the Civil Aviation Administration of Vietnam, said the airline had been hit by a slew of incidents like cracking windows, engine failures, and pressure system glitches which he attributed to technical errors.

Ryanair pilot demoted after incident



A Ryanair pilot was demoted following a serious incident on a flight carrying 128 passengers from Stansted to Cork last year, it has emerged.

Poor communications between the pilot and co-pilot led to the incident, where the Boeing 737-800 aircraft flew too low over Bishopstown, resulting in calls from "alarmed" residents.

The Air Accident Investigation Unit of the Department of Transport (AAIU) today published its investigation into the incident on June 4th last year, with 134 people on board.

The flight over Bishopstown was reported to the Cork Airport Authority by "at least 16 upset residents, whose independent and consistent complaints, submitted by phone and in writing, referred to noise and how low the aircraft was being flown", the AAIU report says.

The captain was at the controls on the day, and the co-pilot, who was less experienced on the aircraft type than the captain, later recalled hearing the warning signals twice and said they were "silenced" by the captain.

According to the report, the co-pilot, who had a better view of the ground to his right, "repeatedly" advised the captain of height loss on the turn over Bishopstown, which "alarmed" many residents.

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No safety recommendations are made in the report. It notes that the "experience gradient" between the two pilots in this case was "steep" but not unusual in day-to-day operations and "may have been a contributory factor in the [captain's] attitude to the co-pilot".

The co-pilot had tried to comply with Ryanair's training manual but his "inputs had little effect". The AAIU said this did not excuse the "aberrant deviation" from the airline's standard operating procedures in its approach and landing that day, however.

In a statement, Ryanair said it "co-operated fully with this AAIU investigation and agrees with its findings".

"Following a disciplinary hearing, the pilot in question was demoted for deviating from Ryanair's standard operating procedures."

Last month, the AAIU reported that a Ryanair flight with 138 passengers and six crew on board almost crashed near Knock when it "overshot" the runway and came way below the recommended flying level due to a series of errors.

NTSB Says Microburst Brought Down Chopper In 2005 Accident

Blasts FAA For Poor Oversight And Not Following NTSB Recommendations

The NTSB Tuesday determined the probable cause of a 2005 fatal air tour helicopter crash in Hawaii as "the pilot's decision to continue flight into adverse weather conditions, which resulted in a loss of control due to an encounter with a microburst."

The board also said inadequate FAA surveillance of compliance with Special Federal Aviation Regulation (SFAR) 71 operating restrictions contributed to the accident, and the lack of helicopter flotation equipment contributed to the loss of life.

On the afternoon of September 23, 2005, an Aerospatiale AS350BA helicopter (file photo of type below), registered to Jan Leasing, and operated by Heli-USA Airways, encountered adverse weather and crashed into the Pacific Ocean several hundred feet off the coast of Kailiu Point, near Haena, HI.

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The flight departed from Lihue Airport for an intended 45-minute tour of Kauai island. Three passengers died of drowning or drowning-related circumstances; the commercial pilot and two other passengers received minor injuries.

Investigators noted air tour pilots typically use their own judgment, based on the appearance of the weather conditions, to determine whether to proceed with a flight and the island's unique weather patterns involving daily, brief, localized rain showers, means air tour pilots sometimes encounter and briefly penetrate areas of precipitation during flights.

The helicopter was not equipped with flotation equipment and sank quickly after hitting the water. Although each occupant wore a waist pouch containing a vest-type personal flotation device (PFD) and were briefed on its use, not all were able to put it on and properly inflate it after exiting the downed chopper. One surviving passenger said the helicopter touched down and rolled on its side submerging the cabin within about three seconds.

In a 1995 report on the US air tour industry, the board noted that combined use of PFDs and helicopter flotation equipment provided an optimum level of safety for passengers in the event of an emergency ditching, and urged the FAA to reconsider the SFAR 71 rule that allowed Hawaii air tour operators to provide only one or the other.

On October 22, 2003, the FAA issued for public comment a proposed rule that would have required most types of air tour helicopters operating over water to be equipped with fixed or inflatable floats. However, says the NTSB, the final rule, while providing for enhanced oversight of commercial air tours, falls short on mandating helicopter flotation devices when PFDs are provided.

"This flight into dangerous weather conditions had tragic consequences," said NTSB Chairman Mark V. Rosenker, "but lives might have been spared if the helicopter had flotation equipment. I am disappointed that the rulemaking process once again has moved so slowly and that the final result still leaves open a real safety gap."

L2 Consulting Services, Inc. Receives STC For Honeywell's RAAS System On B757 Aircraft

L2 Consulting Services, Inc. announced recently that the Federal Aviation Administration has granted the company with a Supplemental Type Certificate (ST10609SC) for the installation of the Honeywell Runway Awareness and Advisory System (RAAS) on B757 series aircraft. This new safety system aims at reducing the growing number of aircraft accidents on airport surfaces.

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According to the company, L2 is the only company to hold the STC for the Honeywell RAAS installation on the 757 and 767 aircraft types and is making the STC immediately available for usage rights to B757-200/200PF/200CB/300 series aircraft owners and operators.

Runway and taxiway accidents are a serious safety concern. "The RAAS increases cockpit crew position awareness reducing errors leading to runway incursions. L2 is pleased that we can offer a RAAS solution to our B767 and now B757 customers," said Jeff Rex, L2 Vice-President of Integration.

The L2 Supplemental Type Certificate was accomplished on a VIP B757-200 aircraft operated under FAA Part 121 by Pace Airlines for the Dallas Mavericks.

Neil Sparkman, Manager of Maintenance for the Dallas Mavericks said, "We feel that the addition of the RAAS to the Mavericks B757 augments our current safety measures and soon, other 757 operators will follow our lead."

The RAAS system, manufactured by Honeywell, provides improved situational awareness through aural advisories for flight crew thereby lowering the likelihood of potential runway incursions. The RAAS is a software upgrade hosted in the Honeywell Enhanced Ground Proximity Warning System (EGPWS).
This particular installation was accomplished using the Mark V Enhanced Ground Proximity Warning System with software version -224-224. The RAAS uses a Global Positioning System coupled with an internal airport runway database to monitor the airplane's location and provide voice advisories.

Hospitals learning safety lessons from aviation

Medicine first adopts CRM/MRM in anesthesia.

A surgical team is about to wrap up a procedure. A scrub nurse notices that a sponge is missing. She hesitates, wondering whether to say anything. The surgeon is well known and highly regarded. Does she speak up and avoid a medical mishap? Aviation safety training may hold the answer.

Evanston Northwestern Healthcare is one of several hospitals taking a cue from the airline industry, training its OB/GYN staff in safety techniques used by cockpit crews. The step is intended to reduce hospital errors by eliminating the hierarchy in health care and improving staff communication.

When investigators listened to black-box recordings after aviation accidents in the late 1970s, they realized that part of the problem was people not speaking up in the cockpit. Human error is the culprit in many airline accidents, the same as with medical errors. And the resulting toll is heavy, with a 1999 report by the Institute of Medicine estimating that as many as 98,000 patients die annually from preventable medical errors. Some estimates are even higher.

The Evanston hospital began implementing aviation-based safety techniques Nov. 1. While some hospitals begin training after a bad outcome, the goal in Evanston was to be proactive and prevent errors, said Dr. Ian Grable, maternal and fetal medicine specialist. "The complexity of medicine has gotten so much greater that it's not possible to do it alone. It needs to be a team all working toward the same goal."

Safer Healthcare, a training and consulting company based in Denver, tailored a four-hour program for the Evanston staff. Over two weeks, all labor and delivery staff members completed the course, with plans to expand training to operating room staff this spring.

"The whole idea of crew resource management is that we all have expertise and know our jobs, but we don't work together as a team," Grable said. "In medicine as in the airline industry, there is a hierarchy. People don't question those who are more experienced. In the trenches of labor and delivery, we need to eliminate the hierarchy, work together, know each other's roles and be able to communicate on the same level."

The hospital now schedules team meetings throughout the day with all labor and delivery nurses, physicians, even secretaries. "We assess each patient's condition when they came in, where they are now, and make recommendations," Grable said. Staff members not only update others on their cases but learn what is happening on the unit as a whole.

Mistakes can happen when doctors don't communicate what they are thinking, Grable said. "They may be intensely focused on an issue but don't know what's happening around them. An example is when the anesthesia team and surgery are working independently. If something is not going well on the surgical side, then the anesthesiologist needs to know and make choices."

Training empowers every member of the team to communicate. In the sponge example, everyone hears the comment. If someone ignores the comment, the scrub nurse goes up her chain of command to the circulating nurse. "The scrub nurse must be able to say, `Wait, stop, I think there is a problem here,'" Grable said.

"It's a cultural change," said Peggy Ochoa, labor and delivery nurse with the Evanston hospital. "We have briefings and debriefings too. If something is difficult, we discuss it as a group. When you see medical mistakes, people don't talk about it. Our goal is that if there is a problem, it gets rectified and is talked about with all the people who need to know, and it's not going to happen again."

Other area hospitals using aviation-based safety techniques include Advocate Health Care, Children's Memorial Hospital, Highland Park Hospital and Northwestern Memorial Hospital.

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Not everyone agrees that aviation safety translates to health care, however.

"Aviation carries a kind of mystique that allows people to imagine that imitating pilot training will produce wonderful results," said Dr. Richard Cook, associate professor in the department of anesthesia and critical care and director of the cognitive technologies laboratory at the University of Chicago.

"We are still waiting for conclusive data saying that this specific type of aviation training makes the OR or hospital a safer place for patients," Cook said. "It's likely that these approaches can improve performance where it is already good. But it's far from clear that training conducted over a few days by a few highly paid consultants makes a great difference.

"I'm not saying you should not do these sorts of things," Cook continued. "But there is no magic here and no amount of feel-good training is going to make the issues related to the complexity and hazards of health care go away. There are lots of ways to make the system safer. This might be one. But what else are you doing?"

THOSE ACHING KNEES and HIPS

One in 5 Americans age 60 and older have experienced significant knee pain on most days over the last six weeks, and 1 in 7 reports significant hip pain. Each year, Americans make about 15 million visits to doctors for knee pain and 6 million visits for hip pain.

FAST FACTS

Exercise in water supports your weight, reducing stress on your joints

- **One in 5 Americans over age 60 have experienced significant knee pain**
- **One in 7 Americans over age 60 report significant hip pain**
- **451,000 knee replacement procedures were performed in 2003 in the U.S.**
- **364,000 hip replacement procedures were performed in 2003 in the U.S.**

Ten thousand steps a day. That's how far you must walk to meet government guidelines for physical activity to improve health. But if, like millions of people, you find walking painful or you fear your joints might buckle beneath you, each step might as well be a mile.

Your knees and hips are your largest joints. They support your body's weight and they must work in close coordination to provide the mobility most people take for granted until injury, arthritis, or other problems interfere.

Joint replacement may be the answer

Depending on the cause of your pain, the solution might be a **set of exercises designed to strengthen and stretch the muscles that support the joint, taking some of the stress off the joint itself.** Minor surgery may also help. For many people, knee and hip problems become so intractable that the best solution is to replace a worn-out knee or hip with a mechanical joint. In the United States in 2003, there were 451,000 knee replacement and 364,000 hip replacement procedures performed. The average age at which a person has such surgery is 65 to 70.

Physically, your knees and hips are closely interdependent, located as they are at either end of the thighbone. This proximity means the angle of your hip affects the pressure on your knee. A hip disorder may cause knee pain, and knee disorders can aggravate hip problems.

People live longer than they used to, so joints need to stay strong and healthy through those additional years. But both knees and hips are subject to repetitive trauma — wear and tear — as you age, and you can traumatize them further if you increase your physical activity suddenly.

Advanced techniques make surgery easier

Medical care has changed in recent years. Doctors used to follow surgery by immobilizing the joint with a plaster cast. Weeks of immobility caused the muscles to weaken and shorten, resulting in long-lasting stiffness and poor function. Today, you can wake up from surgery with your knee already being gently bent and straightened by a machine. In addition, knee and hip replacements have freed thousands of patients from life in a wheelchair or on crutches.

Surgical techniques have also advanced. More surgery is performed through tiny incisions using an arthroscope, often on an outpatient basis. Pain relief has moved away from mind-clouding narcotics toward pain relievers that tackle the twin problems of pain and inflammation.

And finally, **prevention** has moved to center stage, alongside surgical repair and rehabilitation. **More strength training added to your daily exercise routine helps support the joints and protect them from injury.**

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Picture This!

END